



Investigations for Year 11/12 Physics students

Task:

Perform an in-depth qualitative study on a Sciencentre object. The study involves five stages of investigation including investigation of the object in the Sciencentre, as well as further research and reporting after the visit.

1. Engage

- Engage with science objects at the activity stations in the Sciencentre.
- Choose an object that you found particularly interesting for further investigation. A good object to investigate is one that:
 - i. Raises some questions in your mind that may not be fully explained in the “What’s going on” card.

- Record your observations in a suitable data table.



Hand battery

- ii. Allows some degree of experimentation with basic variables.

Eg. Plasma ball; Hand battery; Hand generator

2. Explore:

- Explore the object to determine what variables (independent) can be controlled and identify the dependent variables.
- At this stage you should be quite familiar with the operation of the device so that you can identify and control variables.



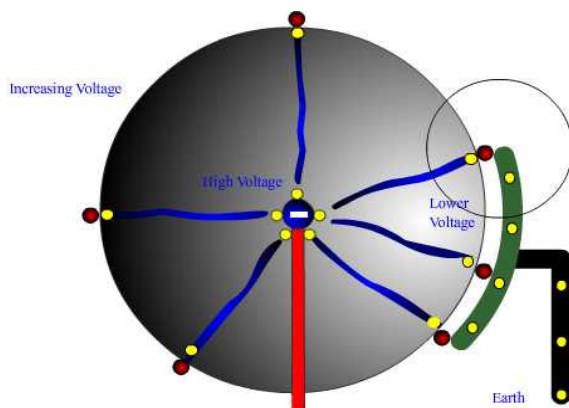
Hand generator

3. Explain:

- Read the Sciencentre activity card: “What’s going on?” to determine a basic scientific explanation behind the operation of the object. Remember, this has been written for a younger audience with perhaps a more limited background in scientific principles than your own.
- Identify any fundamental scientific laws or principles that might apply. Eg. Conservation of energy.
- **Focus questions:**
 - i. Does the explanation given in “What’s going on?” seem adequate in explaining your recorded observations?
 - ii. Does the explanation seem consistent with other known scientific laws and principles?
 - iii. Indicate any limitations of the explanation with regards to your observations or scientific principles.

4. Elaborate

- Your investigation and the partial explanation should have prompted some further questions to answer.
- Write three questions about your object or the explanation that you would like to know more about.
- Can you perform further tests with the existing object and resources to help determine answers to your questions? Try this now and record any data.



Sample plasma ball diagram

- **Further research: (post visit or use the internet on your mobile)**
 - Use reference resources to find possible answers to your questions.
 - Construct a model of your object that will allow you to carry out further experiments to investigate the science behind its operation.
- Construct an alternative explanation for your device that better accounts for your observations and known scientific principles. Write your explanation so that it is suitable for your fellow students to understand.

5. Evaluate

- Share your findings and explanations with your peers in the form of a report and welcome feedback.
- Review your explanations in the light of feedback received.
- Reflect on your learning about your chosen science object.

Why did that happen?

- Electricity is made by moving coils of wire past magnets.

Can you see the coils of wire and the magnets?

- The energy from your hand is used to make the electricity.
- The more energy you supply, the more energy you get out.

Why does turning the handle faster make the light glow more brightly?

Sample hand generator explanation for younger students